

**WHAT IS CLAIMED IS:**

1. An ATM (Asynchronous Transfer Mode) multiplexing apparatus for being connected to an ATM switching unit and each of plural subscribers through ATM communication lines and performing multiplexing processing to ATM cells sent from the plural subscribers, the ATM multiplexing apparatus comprising:

5 detection means for detecting a congestion state corresponding to received ATM cells from the subscribers and outputting a warning signal of a level value according to the congestion state; and

10 discard means for selectively discarding the received ATM cells from the subscribers on the basis of a communication state determined by received ATM cells from the ATM switching unit and the received ATM cells from the subscribers and the level value of the congestion state indicated by the warning signal from the detection means.

2. An ATM multiplexing apparatus as defined in claim 1, wherein the communication state is updated on the basis of header information and its received notification included in the received ATM cells from the ATM switching unit or header information and its received notification included in the received ATM cells from the 5 subscribers.

3. An ATM multiplexing apparatus as defined in claim 1, wherein the detection means comprises storage means for storing the received ATM cells from the subscribers, and comparison means for generating the warning signal on the basis of the degree of occupancy in the storage means of the stored ATM cells and the preset threshold.

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4. An ATM multiplexing apparatus as defined in claim 1, wherein the discard means comprises:

switching unit monitor means for receiving the ATM cells from the ATM

switching unit and outputting header information and received notification of the received

5 ATM cells from the ATM switching unit as first header information and first received notification;

subscriber monitor/selection means for receiving the ATM cells from the subscribers and outputting header information and received notification of the received ATM cells from the subscribers as second header information and second received

10 notification and selectively discarding the received ATM cells from the subscribers on the basis of a discard command; and

discard control means for updating status data indicating the communication state on the basis of the first header information and the first received notification or the second header information and the second received notification and generating the discard

15 command for commanding discard of the received ATM cells from the subscribers on the basis of the updated status data and the level value of the warning signal.

5. An ATM multiplexing apparatus as defined in claim 4, wherein the status data is formed of status flags and received time of the ATM cells from the ATM switching unit or the subscribers, and the discard control means comprises:

a status table for storing the status data on the basis of an address corresponding to

5 the first header information or the second header information;

a table control part for responding to the first header information and the first received notification or the second header information and the second received notification and generating a control signal for commanding update of the status data;

an elapsed time decision part for outputting a time-out signal on the basis of a

10 comparison between the elapsed time from the received time to the present time of the status data read out responding to the control signal and the preset reference elapsed time;

and

a discard decision part for updating the readout status data on the basis of a signal related to either the first or second received notification and the time-out signal and the

15 second header information and generating the discard command on the basis of the updated status data and the level value of the warning signal.

6. An ATM multiplexing apparatus as defined in claim 4, wherein the updated status data is generated on the basis of criteria of the preset state transition.

7. An ATM multiplexing apparatus as defined in claim 4, wherein the discard command is generated on the basis of criteria of the preset logic decision.

8. An ATM multiplexing apparatus as defined in claim 5, wherein the status flags include connection data providing a two-way connection state established by the received ATM cells from the ATM switching unit and the received ATM cells from the subscribers, position data providing a position of the received ATM cells from the subscribers in a

5 packet signal corresponding to an ATM adaptation layer (AAL)5, discard data providing whether cell discard processing corresponding to the packet signal is performed or not when the ATM cells from the subscribers constitute the packet signal, and an AAL data indicating whether the received ATM cells from the ATM switching unit and the subscribers constitute the packet signal or not.

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9. A discard method of ATM cells comprising the steps of:

receiving ATM cells sent from subscribers and detecting a congestion state of the received ATM cells from the subscribers;

5 updating data providing a communication state determined by the received ATM cells from the subscribers and received ATM cells from an ATM switching unit responding to receipt of the ATM cells from the subscribers or the ATM switching unit;

deciding whether discard processing of the received ATM cells from the subscribers is performed or not on the basis of the updated data and a level value of a signal indicating the congestion state; and

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10 selectively performing the discard processing on the basis of the decision result.